

Balanus crenatus Bruguière. Isle La Motte, Grand Isle, St. Albans, Burlington.

A few other species have been reported in the literature: some are undoubtedly synonymous with certain of the species listed above. The presence of a few other species could not be verified, either from our field work or from the examination of the various collections, and therefore they are omitted here; they will, however, be discussed in a later report.

SOME NOTES ON AN OLD RACE OF CALIFORNIA
LAND SNAIL WITH DESCRIPTIONS OF
THREE NEW FORMS

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HELMINTHOGLYPTA CARPENTERI (Newcomb). Plate 1, figure *a*.

This snail has long been imperfectly known, for good material has not been available for study and comparison with allied forms until the last few years. Because of the heat and consequent dryness of its habitat, *H. carpenteri* is a difficult shell to find in first-class adult condition. Although we have not examined them, Bartsch¹ has no doubt correctly assigned specimens in the National Museum from Maricopa and McKittrick in western Kern County, California, to *carpenteri*. Recent collecting has resulted in many lots of this shell, which add so much to knowledge of it that the following notes may be of interest, especially to students of the *traskii* group.

The shells are extremely variable in size, as a subsequent table of measurements shows, and we have good reason to suspect that this variability is due in large part to the variation in rainfall (and therefore in snail food) from season to season. The measurements also show, however, that the general form of the shell is remarkably constant.

In life the shells are semi-polished, of a beautiful straw color. The dark brown band has one of pale cream color below, and another rather indefinite one of the same color above. Spiral sculpture is faint but easily detected on the last two whorls under a magnification of $\times 10$ and is fairly uniform over the surface of

¹ Bartsch, Paul, Proc. U. S. N. M., Vol. 51, No. 2170, 1916, pp. 617-8, pl. 115, figs. 4-6.

these whorls. The nucleus is not sharply differentiated from the remaining whorls; its sculpture consists (when most perfectly preserved) of a series of tiny papillations, set on a background of silk-like radial lines of growth. Often neither one of these markings is visible and at best they require excellent illumination and high magnification to be seen at all.

Dead shells of *carpenteri* are strewn over the border of the valley floor and among the foothills on the west side of Fresno, Kings, and Kern Counties. Frequently they are found far removed from what would appear to be suitable snail cover. Living specimens have been found mostly in rock slides on north slopes but sometimes in rather exposed locations. Exposures of Etehegoi, Temblor, Tejon, and Cretaceous sandstones furnish the best cover.

The coloration of the shell led us at one time to suspect that *carpenteri* might belong to the genus *Micrarionta*, but an examination of the anatomy, shown in fig. 2, on page 14, indicates at once that it should be retained in *Helminthoglypta*. Even so, there are some striking features to the soft parts. The mantle is grayish-white in color with no other color markings of any kind. The mucous gland is double and located in a membranous sac that permits evagination of the organ, at least in part. The details of the genitalia are believed to be sufficiently shown in the figure so that minute description is unnecessary.

The table of measurements following shows the extreme variation in size :

	<i>Max. Diam.</i>	<i>Min. Diam.</i>
Largest shell (from Lot No. 27615)	23.6 mm.	15.4 mm.
Smallest shell (from Lot No. 24807)	15.0	10.7
Average of 111 shells	19.1	12.0

The shell illustrated in the accompanying figures is haplotype No. 7137 (Calif. Acad. Sci., Paleo. Type Coll.), from Loc. No. 27612 (C.A.S.), Chico Martinez Creek, Kern Co., California, coll. by G. D. Hanna and C. C. Church. We have examined the lots shown in the table on p. 12.

The last-named lot comes from the Salinas Valley, far removed from what appears to be the normal range of *carpenteri*, which is found along the western edge of the San Joaquin Valley. How-

C.A.S. loc. number	No. of speci- mens	Locality	Coll. by
24808	3	S. end of Panoche Hills 4th large creek N. of Panoche Cr. Fresno Co., Calif.	G. D. Hanna & C. C. Church
24809	2	Sec. T18S, R15E, Domingene Ranch Road, Fresno Co., Calif.	G. D. Hanna & C. C. Church
24810	10	Jacalitos Cr., Fresno Co., Calif.	G. D. Hanna
24844	5	Arroyo Ciervo, Fresno Co., Calif.	C. C. Church
24876	3	Sec. 34, T22S, R18E, Kettleman Hills, Kings Co., Calif.	
26809	3	E. flank of N. Dome, Kettleman Hills, Kings Co., Calif.	G. D. Hanna & F. A. Menken
24805	1	1 mi. S. of Big Tar Canyon, Kings Co., Calif.	G. D. Hanna
24134	10	Extreme S. end of Reef Ridge, Kings Co., Calif.	G. D. Hanna & J. H. Show
24807	20	NE. cor. Sec. 28, T25S, R18E, on W. side of road from Devil's Den to Keek's Station, Kern Co., Calif.	G. D. Hanna & J. H. Show
25605	13	Wagonwheel Mountain, Kern Co., Calif.	C. C. Church
27615	9	Carneros Cr., W. side of Kern Co., Calif.	G. D. Hanna & C. C. Church
27612	6	Chico Martinez Creek, Kern Co., Calif.	C. C. Church & G. D. Hanna
24126	6	N. end of Gould Hills, Kern Co., Calif.	G. D. Hanna
27614	3	Upper end of Salt Cr., W. side of Kern Co., Calif.	C. C. Church & G. D. Hanna
27613	15	SE. side of Orchard Peak, Kern Co., Calif.	G. D. Hanna
23350	2	2 mi. W. of Maricopa, Kern Co., Calif.	G. D. Hanna
27617	32	1 mi. NE. of San Lucas, Monterey Co., Calif.	F. A. Menken

ever, a critical examination fails to show any marked differences between these shells and *carpenteri*, and future collections may prove that its range extends across the ranges of hills that separate the two major valleys.

HELMINTHOGLYPTA SIMILANS, new species. Pl. 1, fig. *d*. Fig. 1.

Holotype small, thin, with slightly depressed spire; apical angle about 105° ; umbilicus narrow; whorls $5\frac{1}{4}$, well rounded, the last more convex below than above the periphery, descending slightly at the aperture; peristome simple, thin, with very little reflection, set at an angle of 30° with the vertical, its basal termination well reflected but only barely obscuring the umbilicus; callus wash between terminations very thin. Nuclear whorls nearly 2, wrinkled on the first half turn, the wrinkles consisting of low, irregular ridges; these give way on the remaining nuclear whorls to irregularly spaced, rounded papillations, moderately closely placed, which continue over the post-nuclear whorls above and below and into the umbilicus; on the upper portion of the last whorl these papillations are set more closely and in a somewhat descending spiral arrangement; lines of growth irregular, merging into one another, not prominent; spiral sculpture absent or very faint; periostracum exceedingly thin, brownish-buff, with a revolving dark band bordered above and below by bands much lighter in color than the remainder of the shell; bands not sharply defined. Max. diam., 25.8 mm.; min. diam., 13.7 mm.; alt., 9.6 mm.; diam. of umbilicus, about 1.4 mm.

Holotype: No. 7136 (Calif. Acad. Sci., Paleo. Type Coll.), from Loc. No. 25624 (C.A.S.), $\frac{3}{4}$ mile SE. of Oil City, Fresno Co., Calif.; G. H. Hanna and C. C. Church colls.

The separation of this form from *H. carpenteri* (Newc.), with which it is sometimes associated in locality range and to which it is similar, is rather difficult in old, white-weathered dead shells. With live or even well-preserved adult dead shells, however, the two are easily distinguished. *H. similans* averages smaller in size but the two overlap in all measurements. No good characters separate them in the nuclear structure or shape of shell. The shell of *similans* is covered with small papillations, lacking in *carpenteri*, which has well-incised spiral sculpture, obsolete or not present at all in *similans*. Also, the growth lines of *similans* join together in an irregular manner, which is not true in *carpenteri*. Shells of living specimens of the latter are more highly polished than the former, which is duller because of its peculiar sculpturing.

Of the named species of the *traskii* group, *similans* resembles *cuyamacensis*, but this form is larger, has a wider umbilicus, and is much more densely covered with papillations that do not fol-

low any particular arrangement, at least on a series of specimens at hand from Warner's Springs, San Diego Co., Calif.

The mantle of the animal of *similans* is densely blotched with black, whereas in *carpenteri* the mantle is entirely free of such markings.

The range of *similans* lies within that of *carpenteri* along the west side of the San Joaquin Valley. Except for one colony discovered in the drainage of Big Tar Canyon, Kings Co., and another in the Salinas Valley, it has only been found in a limited area in the vicinity of Coalinga, Fresno Co. Usually it seems to occupy rocky hillsides farther removed from the valley floor than *carpenteri* and this may possibly account for its relatively recent discovery in a well-known territory. The two species do not occur in the same colonies, at least not normally.

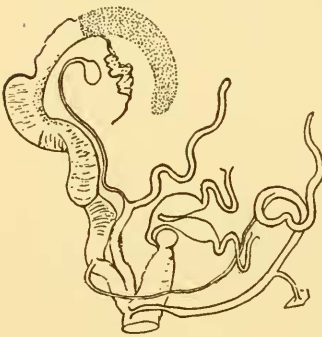


FIG. 1

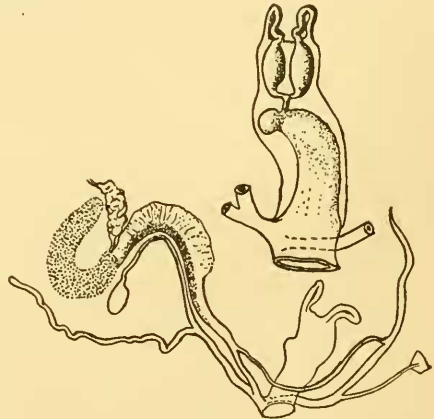


FIG. 2

	<i>Max. diam.</i>	<i>Altitude</i>
Largest shell	18.5 mm.	12.0 mm.
Smallest shell	14.0 "	8.5 "
Average of 53 shells	14.9 "	10.2 "

Coalmine Creek, Fresno Co. (C.A.S. Loc. No. 24806) :

25624	23	$\frac{3}{4}$ mi. SE. of Oil City, Fresno Co., Calif. TYPE LOT.	G. D. Hanna & C. C. Church
25607	16	Jacalitos Creek, Fresno Co., Calif.	C. C. Church
25606	32	6 mi. above mouth of Jacalitos Cr., Fresno Co., Calif.	C. C. Church

24806	64	Eocene Reef, just N. of Coal-	G. D. Hanna &
		mine Cr., Fresno Co., Calif.	C. C. Church
24130	1	Canoas Creek, Fresno Co.,	G. D. Hanna
		Calif.	
24129	3	Eocene conglomerate 2 mi. N.	G. D. Hanna
		of Big Tar Canyon, Kings	
		Co., Calif.	
27618	17	Mouth of Hamilton Canyon,	F. A. Menken
		5 mi. SE. of King City, Mon-	
		terey Co., Calif.	

HELMINTHOGLYPTA CUYAMA, new species. Plate 1, figure b.

Holotype, nearly average for the species, thin in texture and spire strongly depressed; apical angle 137° ; umbilicus wide, tapering rather sharply to the apex; whorls six, moderately convex, the last slightly expanded and descending at the aperture; peristome simple, moderately reflected, not thickened and not obscuring the umbilicus, inner end connected with a thin callus wash; nuclear whorls nearly smooth, about two, gradually merging into the later whorls which have more or less regular growth lines; spiral sculpture absent; surface somewhat shining, indented by fine irregularly shaped malleations arranged in obscure patches at various places on the body whorl; periostracum extremely thin, light golden brown; revolving band dark brown bounded below by a cream colored band nearly as wide, and above by a narrow indefinite band of the same color. Max. diam., 24.7 mm.; min. diam., 19.8 mm.; alt., 13.5 mm.; diam. of umbilicus, 3.7 mm.

Holotype: No. 7088 and paratypes Nos. 7089, 7090 (Calif. Acad. Sci.) from a rock slide of Franciscan chert on the south side of the highway connecting Santa Maria with Maricopa, 23.7 miles east of the first, Santa Barbara County, California. The locality is two miles west of Cuyama Service Station on Cuyama River. About 50 specimens were taken in the same locality at various times by Messrs. C. C. Church and G. D. Hanna. In May, 1937, the type locality was revisited by Mr. George Willett who informs us that he collected a fair series but no living shells and believes, correctly no doubt, that living specimens must be very deep in the rock slide at that time of year. He also reports finding four specimens of another form referable to *H. traskii phlyctoena* (Bartsch) in the same slide.

RANGE OF VARIATION

	<i>Max.</i> <i>diam.</i>	<i>Min.</i> <i>diam.</i>	<i>Alt.</i>	<i>Diam.</i> <i>of umb.</i>	<i>No. of</i> <i>whorls</i>
Largest shell	28.9	23.4	16.2	4.2	6.25
Smallest shell	18.5	15.0	9.3	2.5	5.50
Highest shell	24.6	19.6	14.9	3.6	6.00
Average of 30 shells...	23.1	18.5	12.5	3.2	6.00

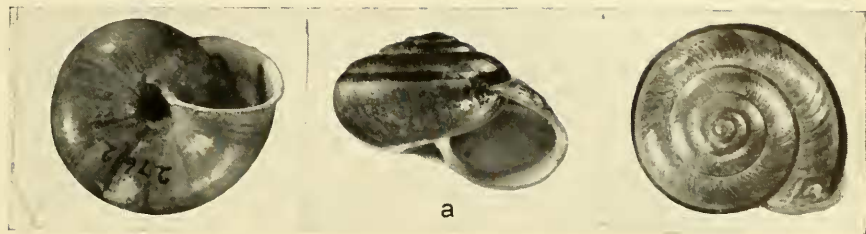
Traces of irregularly arranged papillations are visible on some specimens when considerably magnified; in a young living shell, the sculpture is somewhat more distinct than in the holotype; each of the sparse papillations of the nuclear whorls in this case is set with a stubby, slightly curved hair; on the remaining whorls the papillations are more numerous and there is a suggestion of quincuncial arrangement; these likewise bear short stubby hairs and the surface appears hirsute when magnified 40 diameters.

The species seems distinct from others of the group as might be expected from the isolated collecting station. It is smaller and not nearly so polished as *H. willetti* (Berry) and lacks the characteristic spiral sculpture so pronounced in *H. carpenteri*. The shape is similar to *H. ferrissi* (Pilsbry), a species from the southern Sierra Nevada, but it is a thinner, much lighter colored and larger shell with the umbilicus proportionately narrower; comparison in this case has been made with a large series of specimens (No. 27,791 C.A.S.) from upper Kern River, collected by Mr. Church.

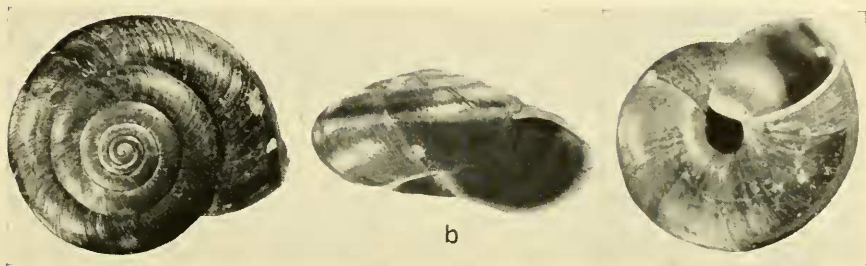
HELMINTHOGLYPTA HERTLEINI, new species. Plate 1, figure *c*.

Shell thin and delicate, pale golden brown, with a very narrow band of a darker shade, bounded below by an equally narrow band of a lighter shade; whorls five, regularly increasing in size; surface marked with fairly coarse growth ridges, and very irregularly scattered papillae; nuclear whorl with faint growth lines and a finely roughened surface; aperture not expanded; peristome simple and scarcely reflected (except in the umbilical region) and slightly thickened interiorly; umbilicus narrow, half covered by the reflected basal wall. Max. diam., 18.5 mm.; min. diam., 15.3 mm.; altitude, 12.5 mm.; diam. umbilicus, about 2 mm.

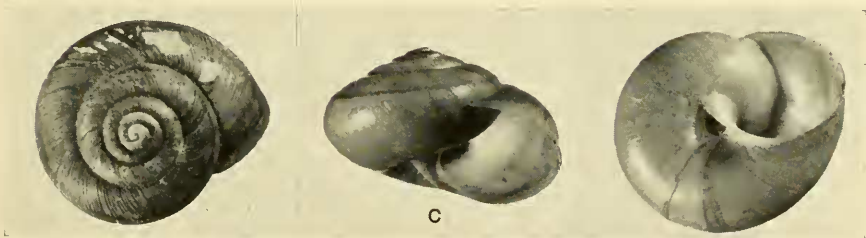
Holotype: No. 7094 and paratype No. 7095 (Calif. Acad. Sci.) from a lava rock slide 6.6 miles east of the junction of the Klamath Falls road with U. S. Highway No. 99; Jackson County,



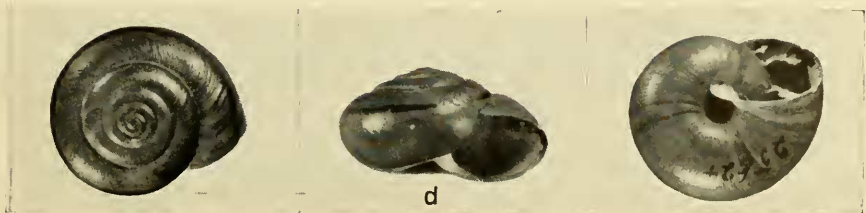
a



b



c



d

a, *Helminthoglypta carpenteri* (Newe.). b, *H. cuyama* H. & S. c, *H. hertleini* H. & S. d, *H. similans* H. & S. Fig. d actual size, the others enlarged.